

Bellwork: 1/10/13 - Period 3

Simplify each square root:

1) $\sqrt{-36}$

$i\sqrt{36}$

$6i$

2) $\sqrt{-7}$

$i\sqrt{7}$

3) $\sqrt{-96}$

$i\sqrt{96}$

$i\sqrt{16 \cdot 6}$
 $i \cdot 4 \cdot \sqrt{6}$
 $4i\sqrt{6}$

Bellwork: 1/10/13 - Period 1

Perform the indicated operation:

1) $(3-9i)-(4+7i)$

2) $(2+i)(3-5i)$

Simplify.

1.) $\sqrt{16 - 4(2)(1)}$

2.) $\sqrt{64 - 4(1)(16)}$

3.) $\sqrt{25 - 4(1)(8)}$

Imaginary NumbersIf $r > 0$, then the imaginary number $\sqrt{-r}$ is defined as follows:

$$\sqrt{-r} = \sqrt{-1} \cdot \sqrt{r} = i\sqrt{r}$$

Example 1:

a.) $\sqrt{-4}$

b.) $\sqrt{-6}$

c.) $\sqrt{-28}$

Example 2:

$$\sqrt{-1} = i\sqrt{1} = i$$

a

a.) Complete the table below.

$$\sqrt{-1} \cdot \sqrt{-1} = -1$$

i	$i^2 = -1$	$i^3 = -i$	$i^4 = 1$
$i^5 = i$	$i^6 = -1$	$i^7 = -i$	$i^8 = 1$
$i^9 = i$	$i^{10} = -1$	$i^{11} = -i$	$i^{12} = 1$

$$\begin{aligned} i &= i \\ i^2 &= -1 \\ i^3 &= -i \\ i^4 &= 1 \end{aligned}$$

Complex Numbers

$$a + bi$$

(standard form)

where a is called the real partand b is called the imaginary part

Example 1: Find each sum and difference.

a.) $(-3 + 5i) + (7 - 6i)$

$$\begin{aligned} -3 + 7 &= 4 \\ 5i - 6i &= -i \\ \hline 4 - i \end{aligned}$$

b.) $(-3 - 8i) - (-2 - 9i)$

$$\begin{aligned} -3 + 2 &= -1 \\ -8i + 9i &= i \\ \hline -1 + i \end{aligned}$$

YOU TRY: Find each sum and difference.

1.) $(-9 + 2i) - (3 - 4i)$

$$\begin{aligned} -9 - 3 &= -12 \\ 2i + 4i &= 6i \\ \hline -12 + 6i \end{aligned}$$

2.) $(-10 - 6i) + (8 - i)$

$$\begin{aligned} -10 + 8 &= -2 \\ -6i - i &= -7i \\ \hline -2 - 7i \end{aligned}$$

Example 2: Multiply $(2 + i)(-5 - 3i)$

F	O	I	L
$2 \cdot -5$	$2 \cdot -3i$	$-5 \cdot i$	$i \cdot -3i$
-10	$-6i$	$-5i$	$-3i^2$
			$-3(-1)$
			$+3$
-10	$-6i$	$-5i$	$+3$

YOU TRY: Multiply $(6 - 4i)(5 - 4i)$

$$\begin{aligned} 30 - 24i - 20i + 16i^2 \\ + 16(-1) \\ 30 - 24i - 20i - 16 \\ \hline 14 - 44i \end{aligned}$$

Algebra 2B - Imaginary & Complex Numbers

☺ In order to simplify a fraction containing complex numbers, you need to use the *conjugate of a complex number*.

Conjugate of a Complex Number

****The conjugate** of a complex number $a + bi$ is $a - bi$

Example 3: Simplify $\frac{2+5i}{2-3i}$. Write your answers in standard form.

YOU TRY: Simplify $\frac{3-4i}{2+i}$. Write your answers in standard form.

YOU TRY: Simplify $\frac{3-2i}{-4+i}$. Write your answers in standard form.

Homework: Period 3: pg 253 #18-²⁶~~20~~ even

Period 1: pg 253 #27-30 all

